

Mahesia ammophila, a new genus and species of interstitial hesionid (Annelida: Polychaeta) from the Indian Ocean

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Abstract.—A new small hesionid, *Mahesia ammophila*, new genus, new species, is described from sand sediments of a coral reef flat of the Seychelles island Mahé. A unique combination of characters (e.g., median antenna frontally inserted, exclusively capillary notochaetae, proboscis without distinct papillae) clearly distinguish this new genus and species from other hesionid taxa.

Pleijel's (1998) comprehensive revision of the Hesionidae, including diagnoses and descriptions of all supraspecific taxa, at long last gives us a better overview of the taxonomy of this important polychaete family, which has been so confusing in the past. It will probably provide a further incentive to describe new generic taxa, such as the one presented here. It was discovered in the meiofaunal communities of the littoral sandy sediments around the Seychelles island Mahé. These benthic communities comprise remarkably large numbers of both species and individuals, and have only just begun to be analyzed faunistically and taxonomically (Westheide 2000). The new genus and species described here is one of the relatively numerous interstitial species at this location in this family, although hardly any characters considered to be typical adaptations to the interstitial environment (Westheide 1984) have yet been observed. Among the other interstitial hesionid species are species of *Heteropodarke* Hartmann-Schröder, 1962 (Hartmann-Schröder 1962, Perkins 1984, Ding et al. 1997, Pleijel 1999), *Sinohesione genitaliphora* Westheide, Purschke & Mangerich, 1994 (Westheide et al. 1994) and, especially, the many species of the genera *Microphthalmus* Meczniukow, 1865 and *Hesionides* Friedrich, 1937 (Westheide 1988). The inclusion

of the two last taxa in the Hesionidae has recently been disputed (Pleijel & Dahlgren 1999). Relatively small hesionids can also be found within the genera *Ophiodromus* Sars, 1862 (e.g., *O. minutus* Hartmann-Schröder, 1959) and *Podarkeopsis* Laubier, 1961 (e.g., *P. arenicolus* La Greca, 1946).

Methods

Animals were extracted from sand with a $MgCl_2$ solution isotonic to seawater (for details see Westheide & Purschke 1988). Live specimens were observed under a light microscope and photographed immediately after sorting. They were fixed in Bouin's fluid; fixed animals were used for making line drawings by means of a camera lucida. Bouin-fixed specimens were also used for scanning electron microscopy; after postfixation in 1% OsO_4 , they were critical-point dried with CO_2 , mounted on aluminium stubs, sputter-coated with gold and examined with a Zeiss DSM 962 scanning electron microscope.

Mahesia, new genus

Diagnosis.—Hesionid with three antennae, the median one frontally inserted. Palps consisting of short palpophore and flask-shaped palpostyle. Four pairs of anteriorly situated biarticulate tentacular cirri

on each side behind prostomium. Chaetigers with capillary notochaetae only; no notoacicula; neuropodium with transparent pointed acicula, heterogomph compound and one to two simple chaetae. Proboscis not armed, without distinct papillae but with ciliary tufts. Anal cirri articulated.

Etymology.—The name *Mahesia* refers to the sampling site of the type species, the Indian Ocean island Mahé.

Type species.—*Mahesia ammophila*, new species, by present designation.

Material examined.—About 20 living specimens from patches of relatively coarse coral sand, covered with shallow water at low tide. Republic of Seychelles, Mahé Island, southern part, east coast, 55°31'E and 4°47'S. Reef flat in front of the beach "Anse Forbans" (22 Feb 1999 and 13 Mar 2000).

Mahesia ammophila, new species

Figs 1–3

Type material.—Holotype whole mounted (glycerine) specimen with 19 chaetigers, deposited at the Senckenberg Museum, Frankfurt, Germany (No. SMF 8897). Two paratypes with 18 chaetigers each in ethanol/glycerine (SMF 8898, 8899) at the Senckenberg Museum and two with 13 and 14 chaetigers in ethanol/glycerine at the Hamburger Zoologisches Museum (P-23240, P-23241). Remaining specimens in the collection of the author.

Etymology.—The first part of the species name is derived from the Greek *ámmos*, sand, the second part is derived from the Greek *philos*, being fond of.

Description.—Pigmentation lacking, animals more or less transparent. Body shape elongated. Length of living animals up to 2.7 mm (23 chaetigers); fixed specimens up to 2.0 mm. Width across body between parapodia ranges from 120 μm in anterior part and ca. 70 μm (fixed specimens) in posteriormost part of body trunk, but relatively large parapodial lobes with widely protruding bundles of chaetae giving a

stouter appearance (width including parapodia about 0.5 mm) (Figs. 1, 2B). Number of chaetigers (excluding the anteriorly situated segments with tentacular cirri) between 8 and 23.

Prostomium more or less rectangular, broader than long; lateral margins slightly convex, anterior margin with slightly rounded median indentation (Figs. 2A, 3A). Facial tubercle absent. Palps arising antero-ventrally on both sides of broad upper lip folds leading into mouth opening (Fig. 3B); biarticulated with short palpophore and flask-shaped palpostyle, similar in shape to paired antennae and of nearly same size. Median antenna arising frontally and somewhat dorsally behind paired antennae; latter almost twice as long as median one; all three antennae flask-shaped (Figs. 2A, 3A).

Two pairs of red-pigmented lensed eyes in trapezoidal arrangement (Fig. 2A), anterior pair larger than posterior one. Nuchal organs forming two ciliated fields around posterior edges of prostomial shield; mid-dorsally widely separated (Fig. 3A).

Pharyngeal tube (=proboscis) undivided, straight, reaching posteriorly to chaetigers 3 or 4 (Fig. 1A, B). No jaws or teeth. Terminal part without distinct papillae, but terminal margin with ring of ca. 14 papillate evaginations, each with terminal tuft of cilia; smaller ciliary tufts also in folds between these evaginations (Fig. 3C).

Four pairs of anteriorly situated cirri (tentacular cirri) on each side behind prostomium, each pair consisting of a dorsal and a ventral enlarged appendage; belonging to four segments, the two anterior ones dorsally difficult to distinguish (Figs. 1A, B, 2A, 3A, B). No chaetae detected in these segments, except for one tiny acicula in dorsal cirrophores of segment 4. Cirri biarticulate, with relatively long cylindrical cirrophores; cirrostyles basally slightly inflated, tapered. Dorsal cirri gradually increasing in length from first to third pair; fourth pair distinctly shorter. Ventral cirri shorter than dorsal ones (Fig. 3B).

Chaetigers (Figs. 2B, 3D, E) identical ex-

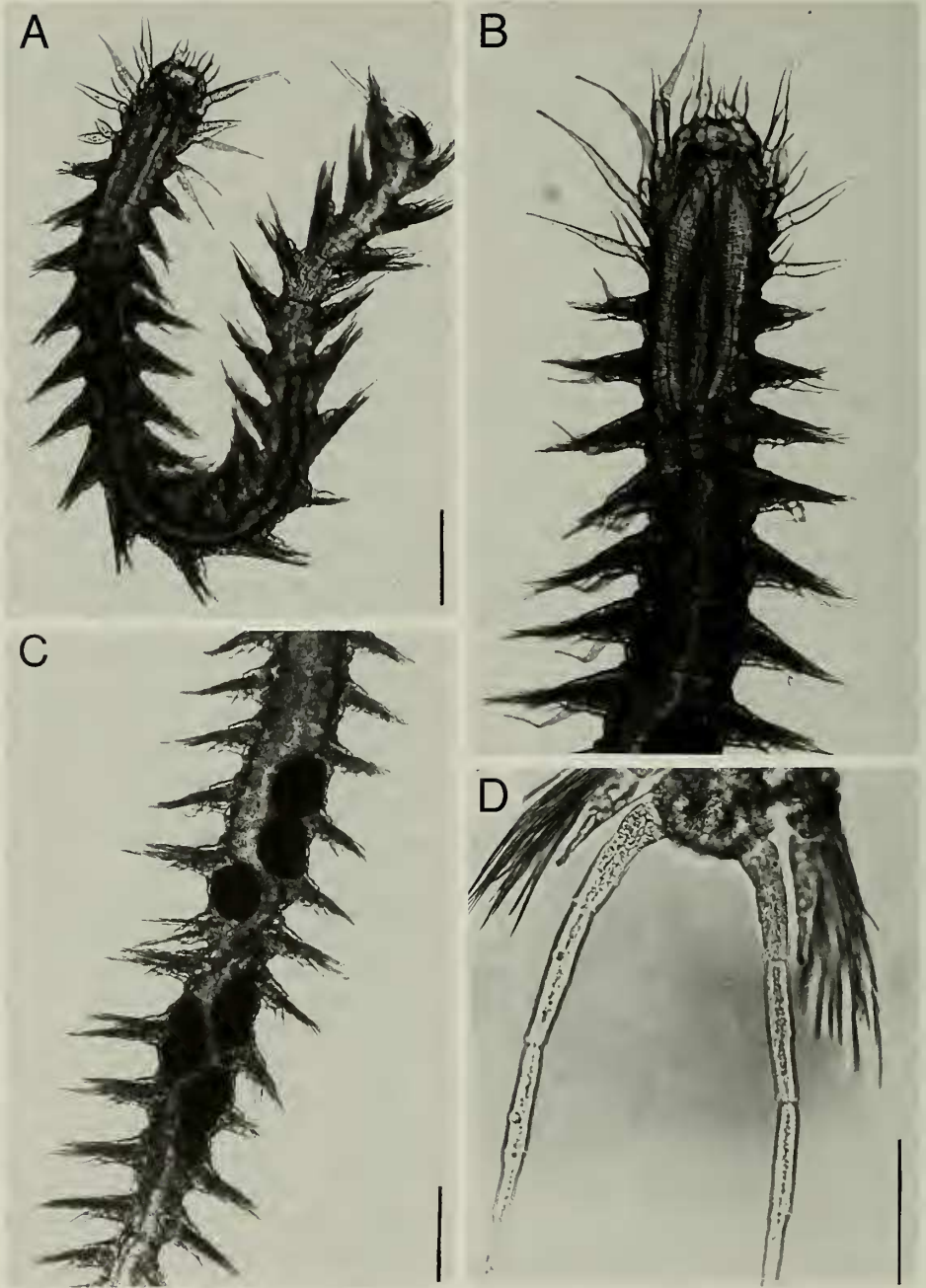


Fig. 1. Micrographs of living *Mahesia ammophila*, new genus, new species. A, entire animal; B, anterior region; C, median region of female with vitellogenic oocytes; D, pygidium with anal cirri. Scale bar in A, C = 200 μ m, in B, D = 100 μ m. Focused on dorsal side.

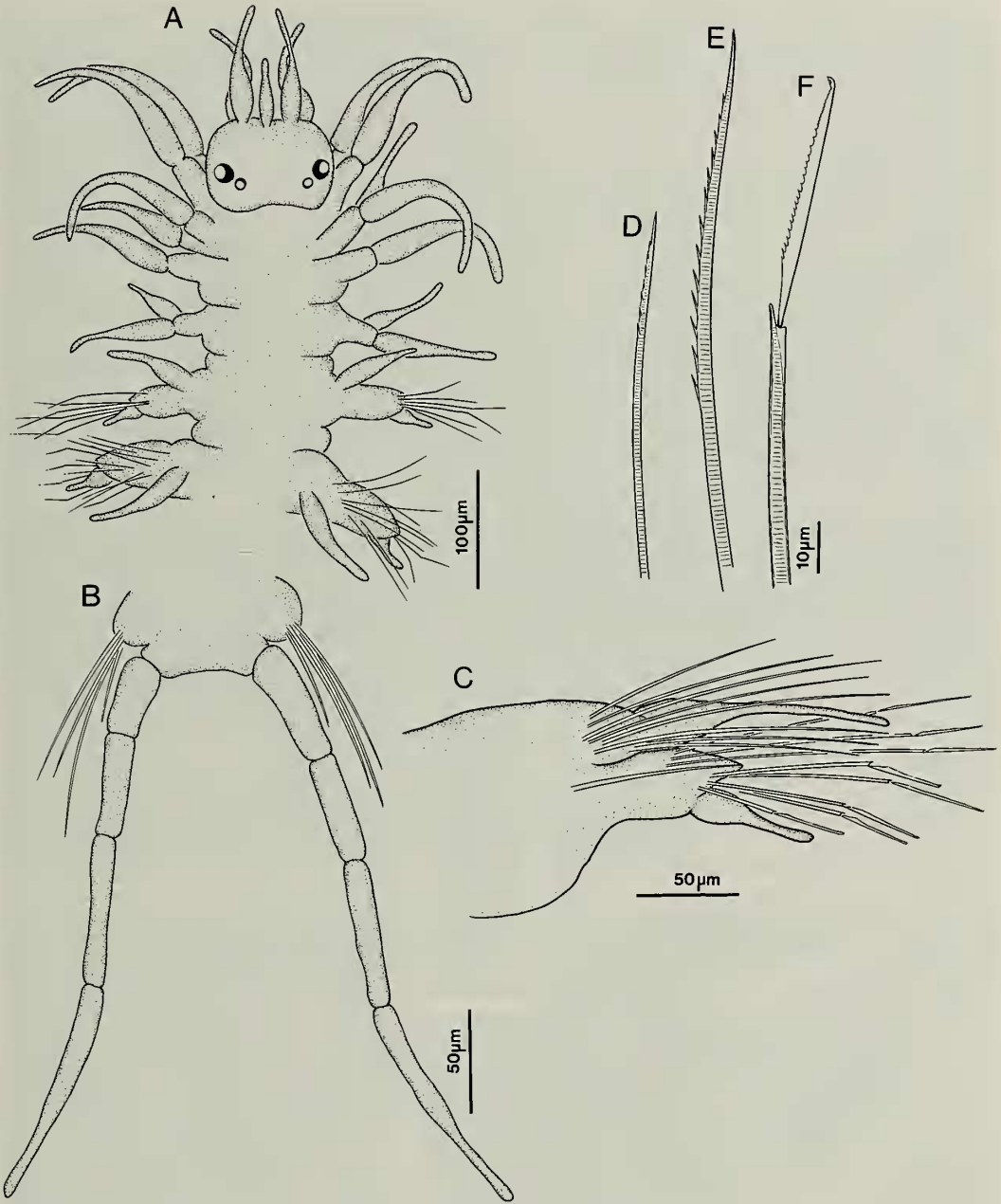


Fig. 2. *Mahesia ammophila*, new genus, new species. A, anterior end, dorsal view; B, pygidium with anal cirri; C, parapodium from posterior part of body, anterior view; D, simple neurochaeta; E, simple notochaeta, only one row of teeth visible; F, compound neurochaeta. Same scale for D-F.

cept for first one (segment 5), lacking notochaetae in larger specimens; in one specimen with 12 chaetigers few notochaetae still present. Dorsal parapodial cirri neither enlarged nor alternating in length, but pos-

teriormost ones slightly or (in large specimens) considerably longer. Dorsal cirri usually not exceeding length of ventral compound chaetae; basal third inflated; tapering, not annulated. From chaetiger 2

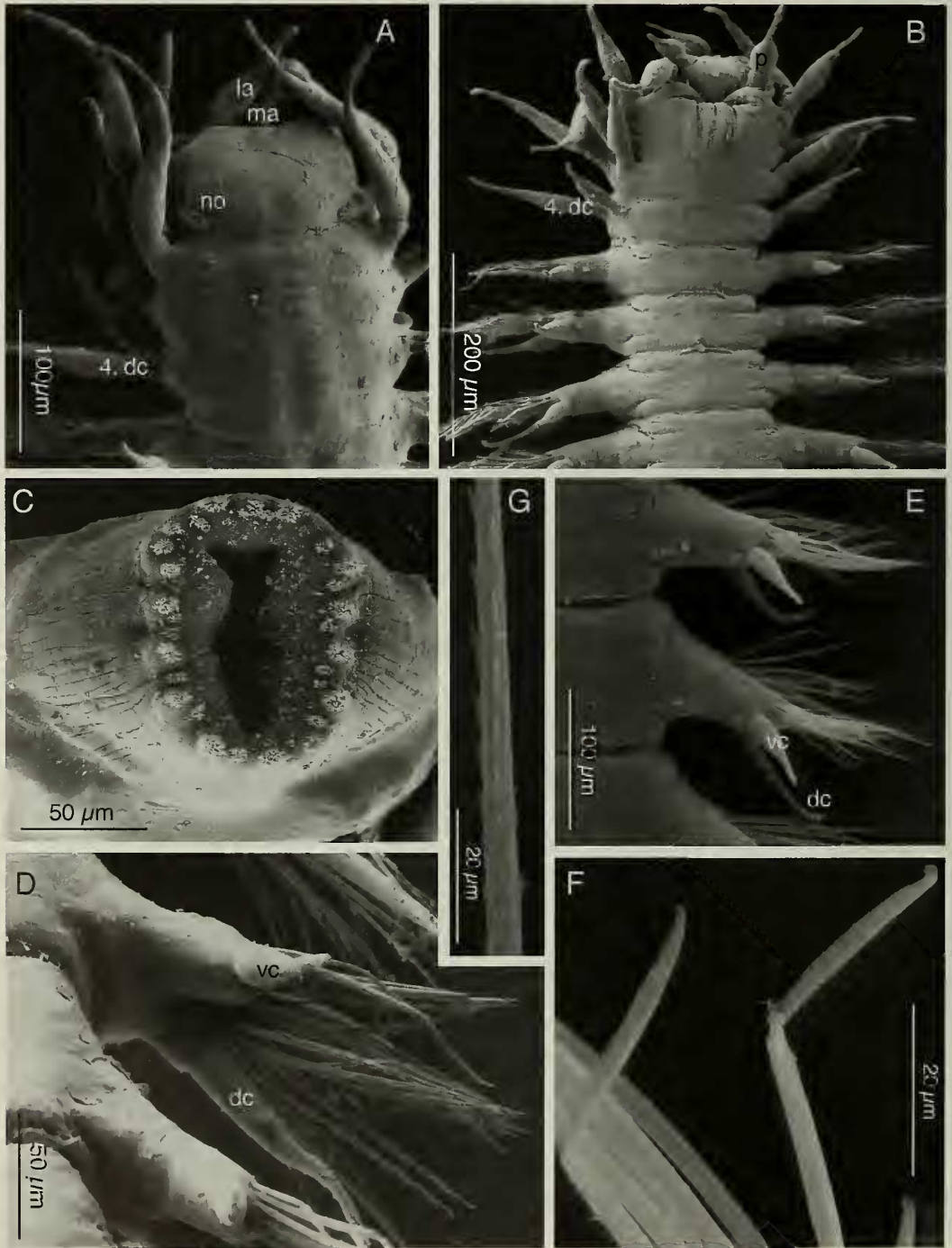


Fig. 3. Scanning electron micrographs of *Mahesia ammophila*, new genus, new species. A, anterior end, dorsal view; B, anterior end, ventral view; C, terminal part of everted pharynx; D, E, parapodia, middle part of body, ventral view; F, compound neurochaetae; G, capillary notochoeta, partly. Abbreviations: dc, dorsal cirrus; la, lateral antenna; ma, median antenna; no, nuchal organ; p, palpus; vc, ventral cirrus.



Fig. 4. *Sinohesione genitaliphora* Westheide, Purschke & Mangerich, 1994. Scanning electron micrograph of terminal part of everted pharynx.

posteriorly notopodial lobe with bundle of up to ca. 16 capillary chaetae, slightly bent; slightly increasing in length posteriorly; with two rows of teeth (Figs. 2E, 3G). Notopodial acicular lobes absent; no notoacacula. Neuropodial lobe rhomboidal. Single transparent pointed neuroacacula. Bundle of up to ca. 15 heterogomph compound falcigers with narrow blades of different lengths, densely and uniformly serrated distally, unidentate; blades gradually increasing in length posteriorly (Figs. 2F, 3F). With 1–2 simple capillary neurochaetae (Fig. 2D), anteriorly situated. Number of chaetae different in different specimens, probably age dependent. All chaetae internally chambered throughout entire length (Fig. 2D–F). Ventral cirrus flask-like, without cirrophore; about half as long as dorsal cirrus (Figs. 2C, 3D, E).

Pygidium nearly hemispherical. Two thread-like anal cirri, oriented like a posteriorly open V, up to 300 μm long; with 1–

4 distinct articulations dividing cirri in 2–5 elongate pieces, distal one especially long and tapered (Figs. 1D, 2B). No median unpaired anal appendage. Laterally between last chaetiger and pygidium one or a few chaetae occasionally present, probably indicating development of new parapodia.

Remarks.—Two of the specimens observed alive were females, each carrying up to 8 spherical or oval oocytes (diameter 75–100 μm), positioned between chaetigers 8 and 13 (Fig. 1C), indicating that the species description is based on adult animals.

Discussion

The new species does not fit in any of Pleijel's (1998) generic diagnoses of Hesionidae. It would follow from the cladistic analysis of this author that the frontally inserted median antenna of *M. ammophila* would place it into his subtaxon Ophiodromini. Median antennal furrows and pro-

boscideal papillae would then have to be regarded as reduced. In the taxon *Parasylidea* Pettibone, 1961, which he also places in this group, the terminal proboscis ring bears no papillae but, instead, fine hairs, presumably cilia (Pettibone 1961, Hartmann-Schröder & Hartmann 1980). This taxon is to some extent consistent with the present species regarding this character, but not in the presence of notochaetae, which are absent in *P. humesi* Pettibone, 1961 and *P. australiensis* Hartmann-Schröder, 1980.

Sinohesione genitaliphora Westheide, Purschke & Mangerich, 1994 resembles *Mahesia ammophila* in the structure of its anterior end (Westheide et al. 1994), but these two species clearly differ in the structure of the terminal ring of the proboscis, which in *S. genitaliphora* bears 14 cone-shaped, broadly based papillae and is here depicted in detail for the first time (Fig. 4). When the new taxon is run with Pleijel's (1998) matrix and both *Sinohesione* and *Mahesia* are scored for 14 papillae, they come out as sister taxa in a cladistic analysis. If this character is excluded, *Mahesia* still falls out within the Ophiidromini but in a different position (F. Pleijel, pers. comm.). Most prominent characters that distinguish *Mahesia* and *Sinohesione* are the external genital organs of the latter in both males and females (Westheide et al. 1994).

Proboscideal papillae are also lacking in *Amphiduros* Hartman, 1959, but this genus has a dorsally inserted median antenna, an autapomorphic character for Pleijel's (1998) hesionid subtaxon Gyptini. However, *Amphiduros* exhibits a number of other similarities to *M. ammophila* (Hartman 1968, Blake & Hilbig 1990, Nuñez et al. 1997, Pleijel 1998): there is no facial tubercle, anterior segments (tentacular cirri segments) 1–4 lack chaetal bundles, notopodial lobes and notochaetae are absent on segment 5, notopodial capillaries have two rows of teeth, furcate notochaetae are absent, and neurochaetae have unidentate blades. This raises the question of the homology of the

position of the median antenna and the importance of this character for phylogenetic reasoning within the Hesionidae. Until more information is available, a close relationship of *Mahesia* with *Amphiduros* is considered no less likely than that of *Mahesia* belonging to the Ophiidromini.

Acknowledgments

The author thanks Anna Stein for technical assistance and Andrea Noël for typing the manuscript. He is indebted to Dr. Fredrik Pleijel, Paris, for discussing the taxonomy of the species, and Dr. Mary E. Petersen, Copenhagen, for correcting the English version of the text.

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